Equations and Constants

$N_A = 6.02\text{x}10^{23}\, mol^{-1}$ $\quad c = 3\text{x}10^{8}\, m/s$ $\quad h = 6.63\text{x}10^{-34}\, J*s$ $\quad k = \frac{1}{4\pi\epsilon_0}$

$e = 1.6\text{x}10^{-19}\, C$ $\quad k = 9\text{x}10^{9}\, N\,m^2/C^2$ $\quad g = 9.81\, m/s^2$

$1\, eV = 1.6\text{x}10^{-19}\, J$ $\quad \mu_0 = 4\pi x10^{-7}\, T*m/A$ $\quad m_e = 9.11\text{x}10^{-31}\, kg = 0.511\, MeV/c^2$

$\epsilon_0 = 8.85\text{x}10^{-12}\, C^2/(N*m^2)$ $\quad \epsilon > \epsilon_0$ $\quad 1\, u = 1.66\text{x}10^{-27}\, kg = 931.5\, MeV/c^2$

$L = L_0\sqrt{1 - v^2/c^2}$ $\quad m = \frac{m_0}{\sqrt{1 - v^2/c^2}}$ $\quad \lambda_p T = 2.90\text{x}10^{-3}\, m*K$ $\quad E_n = \frac{-13.6\, eV}{n^2}$

$\Delta t = \frac{\Delta t_0}{\sqrt{1 - v^2/c^2}}$ $\quad E^2 = (pc)^2 + (mc^2)^2$ $\quad \epsilon = K\,\epsilon_0$ $\quad C = K\,\epsilon_0\frac{A}{d}$ $\quad U = \frac{1}{2}QV$ $\quad C = \epsilon_0\frac{A}{d}$

$\frac{1}{\lambda} = \frac{1}{hc}(E_n - E_{n'})$ $\quad \lambda_n = \lambda/n$ $\quad Q = CV$ $\quad KE = mc^2 - m_0c^2$

$\Delta PE + \Delta KE = 0$

$KE = \frac{1}{2}mv^2$ $\quad W = F\,d$ $\quad d\sin(\theta) = m\lambda$ $\quad E = KE + m_0c^2$

$F = q\,v\,B\sin(\theta)$ $\quad \vec{F} = I\,\vec{l}\times\vec{B}$

$\vec{F} = q\,\vec{E}$ $\quad \vec{F} = q\,\vec{v}\times\vec{B}$ $\quad V = E\,d$ $\quad \vec{F} = m\vec{a}$

$V = \frac{kQ}{r}$ $\quad \lambda = \frac{h}{mv}$ $\quad B = \frac{\mu_o I}{2\pi r}$ $\quad emf = \frac{-\Delta\phi}{\Delta t}$ $\quad \vec{F} = I\,l\,B\sin(\theta)$ $\quad P = I^2R$

$P = V\,I$

$\phi = N\,B\,A\cos(\theta)$ $\quad \Delta PE = q\,\Delta V$ $\quad V = I\,R$ $\quad R = \rho\,L/A$ $\quad I = \frac{\Delta Q}{\Delta t}$

$R_s = R_1 + R_2 + \cdots + R_N$

$\frac{F}{l} = \frac{\mu_o}{2\pi}\frac{I_1 I_2}{L}$ $\quad F = \frac{kQ_1Q_2}{r^2}$ $\quad n_1\sin(\theta_1) = n_2\sin(\theta_2)$

$C_p = C_1 + C_2 + \cdots + C_N$

$\sum V = 0 \quad (closed\ loop)$ $\quad B = \frac{\mu_o}{4\pi}\frac{qv}{r^2}$ $\quad c = f\,\lambda$ $\quad \lambda = \frac{h}{p}$ $\quad E = mc^2$

$\sum i = 0 \quad (junction)$ $\quad E = hf$

$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \cdots + \frac{1}{R_N}$

$n = \frac{c}{v}$ $\quad E = \frac{kQ}{r^2}$ $\quad \frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$ $\quad P = \frac{1}{f}$

$\frac{1}{C_s} = \frac{1}{C_1} + \frac{1}{C_2} + \cdots + \frac{1}{C_N}$

$\Delta E\,\Delta t \geq h/2\pi$ $\quad \Delta N \approx -\lambda\,N_o\,\Delta t$

$\Delta p\,\Delta x \geq h/2\pi$ $\quad m = \frac{h_1}{h_o} = \frac{-d_i}{d_o}$

$Q = (M_A + M_B - M_C - M_D)c^2$ $\quad T_{\frac{1}{2}} = \frac{\ln(2)}{\lambda}$ $\quad r = r_o e^{-\lambda t}$ $\quad N = N_o e^{-\lambda t}$